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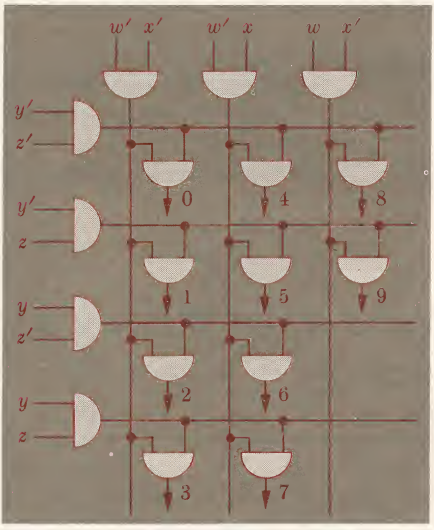

INTRODUCTION TO THE LOGICAL DESIGN OF SWITCHING SYSTEMS

BY H. C. TORNG, *Cornell University*

This book is designed to be used as a text in the first course dealing with the logical design of computers or switching systems and as an aid to practicing engineers. The emphasis of the presentation is placed on delineating the reasoning and thinking necessary to design a switching system. The book's ultimate objective is to enable the reader to pursue advanced study and to practice in the areas of computer switching, communication switching, and control switching.

Besides presenting new results in switching theory, such as the geometrical interpretation of the threshold switching function, systematic approaches in state

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reduction, and sequential circuit decomposition, the text also stresses electronic as well as other switching components. In addition, many illustrative examples are provided along with problem sets of both breadth and depth.

CONTENTS

Introduction • Switching Algebra • Formulation of Switching Functions • Circuit Realization I—Relay Logic • Circuit Realization II—Diode Logic • Switching Function Manipulation Methods • Circuit Realization III—Transistor Gates • Circuit Realization IV—Core Gates • Multiterminal Networks • Cascaded Networks • Sequential Circuits I • Sequential Circuits II—From Circuit Specifications to State Table • Sequential Circuits III—Simplification of State Tables • Sequential Circuits IV—State Assignment and the Completion of Design • Sequential Circuits V—Asynchronous Circuits

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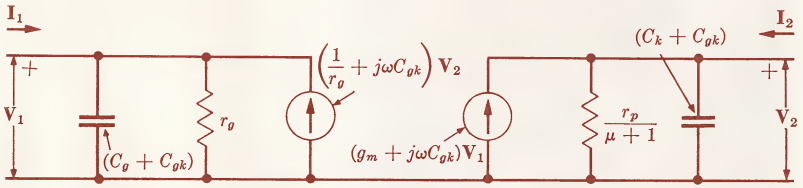

LINEAR ANALYSIS OF ELECTRONIC CIRCUITS

BY GLENN M. GLASFORD, *Syracuse University*

Designed for upper division electronics courses, the main purpose of this text is to provide the reader with a sound technical background for the analysis and design of electronic circuits. Although it is primarily concerned with the applications of electron tubes and transistors and other transistor-like devices, the treatment is sufficiently general that the reader who studies the material with understanding can apply it to other classes of devices. The text deals extensively with those aspects of electronic circuits which lend themselves to linear analytical techniques; however, detailed attention is paid to the graphical techniques involved in location of operating levels or bias points in order that complete and workable designs can be achieved.

CONTENTS

Mathematical Models of Electronic Devices • Topics from Linear Circuit Analysis • Linear Circuit Characteristics of Vacuum Tubes and Transistors • Analysis and Design of Linear Amplifiers • Analysis of Electronic Circuits with Feedback

In Press

MATRIX ALGEBRA FOR ELECTRICAL ENGINEERS

BY R. BRAAE, *Rhodes University*

The aim of this book is to provide the elements of matrix algebra necessary for the study of modern electrical engineering. Assuming no more than a standard engineering mathematics background, the text progresses from first principles to advanced topics and applications. In the course of the exposition, the concepts *transformation, invariance,* and *group* are defined, and the theory of matrices is developed in such a way as to dovetail with that of tensors.

Throughout, the reader is encouraged to adopt a broad point of view. Matrix algebra is more than a system of symbols; it provides a higher point of view that permits essentially nonspatial concepts and relationships to be visualized geometrically.

CONTENTS

Introductory • Scalars and Vectors • 2-Matrices and Determinants • General Solution of Simultaneous Linear Equations • Orthonormal Matrices—Compound Matrices • Linear Transformations and Linear Vector Functions • Bilinear and Quadratic Forms • Application of Matrices to Geometry and Mechanics • Linear Programming • Linear Network Analysis • Diakoptics • Tensor Analysis

162 pp, 22 illus (1964) $4.50

THEORY OF AUTOMATIC CONTROL

BY M. A. AIZERMAN, *Institute of Automatics and Telemechanics Academy of Sciences, U.S.S.R.*

This book will be of primary interest to instrumentation engineers and to electrical engineers teaching in the controls and energy conversion area. It is concerned with the theory, not the technology, of control, being generally limited to the theory that is most important for practical applications, i.e., the design and building of controllers. The text assumes familiarity with the Laplace and Fourier transforms.

CONTENTS

General Introduction to Automatic Controllers • The Construction of a Linear Model Control System and the Initial Material for Its Analysis • The Stability of the Linear Model of an Automatic Control System • The Construction and Evaluation of the Processes in the Linear Model of a System of Automatic Control • Auto- and Forced Oscillation in Non-linear Systems • Appendix 1: Laplace and Fourier Transforms and their Application to the Integration of Systems of Linear Differential Equations with Constant Coefficients • Appendix 2: Table of Trigonometric Functions

519 pp, 251 illus (1963) $11.50

COMPUTER SCIENCE TEXTS

AN INTRODUCTION TO MATHEMATICAL MACHINE THEORY

BY SEYMOUR GINSBURG, *System Development Corporation*

Intended primarily for mathematicians, programmers and logical designers, this book offers a treatment of selected topics on the behavior of mathematical machines, considered from the terminal characteristics point of view. Attention is focused on *complete* and *incomplete* sequential machines, *abstract* machines, and tape recognition devices. In addition, the automaton and various extensions of it are also discussed.

CONTENTS

Complete Sequential Machines • Incomplete Sequential Machines • Abstract Machines • Recognition Devices

148 pp, 113 illus (1962) $8.75

SEQUENTIAL MACHINES: SELECTED PAPERS

EDITED BY EDWARD F. MOORE, *Bell Telephone Laboratories, Inc.*

This book contains the original published form of much of the most important work in the field of sequential machines. Two of the papers are translations from the Russian and appear here for the first time in English. All of the papers, with the exception of one included for historical interest, contain ideas of current research interest.

CONTENTS

The Synthesis of Sequential Switching Circuits • Finite Automata and Their Decision Problems • The Reduction of Two-way Automata to One-way Automata • Probabilistic Automata • Loop-free Structure of Sequential Machines • Canonical Forms for Information-lossless Finite-state Logical Machines • Regular Expressions and State Graphs for Automata • Realization of Events by Logical Nets • Theory of Logical Nets • The Firing Squad Synchronization Problem • On the Class of Events Representable in a Finite Automaton • On a Graphical Representation of the Operating Regime of Circuits • Bibliographic Comments on Sequential Machines • Bibliography on Sequential Machines, Sequential Circuits, and Related Topics

266 pp, 79 illus (1964) $7.50

INTRODUCTION TO PROGRAMMING THE IBM 1620

BY CHARLOTTE FROESE, *University of British Columbia*

Emphasizes principles essential to mastering programming of the IBM 1620, assuming no prior knowledge of computers and very little knowledge of mathematics beyond the freshman level. Material is up-to-date including disk packs and associated monitor system information. Problems and examples used assume a card system with an on-line printer, but are equally applicable for papertape systems. Convenient appendixes describe the instruction codes and Symbolic Programming System.

CONTENTS

Introduction to computing • The IBM 1620 central processor • Programming simple arithmetic operations • Principles of programming • Input/output Symbolic Programming System • Monitor system

88 pp, 14 illus 8½ × 11 size, Paperbound, Ready in May, 1964 $2.00

AN INTRODUCTION TO DIGITAL COMPUTING

BY BRUCE W. ARDEN, *University of Michigan*

Presents introductory material on computing techniques, assuming a knowledge of integral calculus. Statement-type programming language is emphasized which permits the consideration of algorithms more complicated than a machine language approach would allow. Several analytic topics and simple proofs are included to illustrate the analytic basis of numerical methods.

CONTENTS

Functions and example programs • The design of a practical machine • Machine language and components • Number systems and arithmetic • Computational error • Taylor's series and divided differences • The solution of equations • Additional programming topics • Interpolation • Numerical integration • Simultaneous linear equations • Approximation • The numerical solution of differential equations • Non-numerical problems • A simple compiler

389 pp, 150 illus (1963) $9.75

A FORTRAN PRIMER

BY ELLIOTT I. ORGANICK, *University of Houston*

An introductory book on computing techniques directly applicable with digital computers using FORTRAN like the IBM 1620, 1401, 1410, 7070, 7074, 709 and 7090, and the CDC 1604, and Honeywell 800. Several hundred drill exercises and seven programming assignments with complete solutions are given—including multiple solutions on each of several computers. Emphasizes the flow

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chart as a primary means of revealing the structure of a procedure. Input-output and the critically important concept of functions are both treated in depth. Also presented is a detailed look ahead to the next generation language, FORTRAN IV.

CONTENTS

Procedural language approach to use of computers • A quick look at digital computers • Use of computers • Approach to computer use with FORTRAN • Some highlights of the FORTRAN language • The Language Rules of FORTRAN • Introduction • Arithmetic expressions and substitution statements • Conditional control (decision making). Unconditional transfer and other control statements • Input-output • The comment, dimension and equivalence declarations • Defining and calling internal and external functions • Preparation of punch card program decks • Example Problems • Highlights of FORTRAN IV

186 pp, 207 illus, Paperbound, 8½ × 11 (1963) $3.95

AN INTRODUCTION TO ALGOL 60

BY CHRISTIAN ANDERSEN, *Regnecentralen, Aarhus, Denmark*
Visiting Lecturer, Stanford University

Provides a short orientation of the algorithmic language ALGOL 60 with many problems and answers to allow interested persons to learn and use ALGOL 60. The book is based on Professor Andersen's recent three years of experience in using and teaching ALGOL 60. The material is arranged so that it is possible to make realistic ALGOL programs after only a few hours work with the book. A three-color, fold-out syntactical chart of ALGOL 60 helps readers to recognize the relations between different parts of the entire syntax.

CONTENTS

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